Docket No.: 62364A
(PATENT)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of:
Rajen M. Patel et al.

Application No.: 10/507,230 Confirmation No.: 2354

Filed: September 9, 2004 Art Unit: 1791

For: REVERSIBLE, HEAT-SET, ELASTIC FIBERS, AND METHOD OF MAKING AND ARTICLES MADE FORM SAME Examiner: Michael T. Piery

# APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This brief is filed within two months of the December 18, 2009 filing of the Notice of Appeal.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1206:


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|---|---|
| I. | Real Party in Interest |
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| V. | Summary of Claimed Subject Matter |
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REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Dow Global Technologies Inc.

## I. RELATED APPEALS, INTERFERENCES, AND JUDICIAL PROCEEDINGS

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

## II. STATUS OF CLAIMS

### A. Total Number of Claims in Application

There are three claims pending in application.

### B. Current Status of Claims

1. Claims canceled: 34

2. Claims withdrawn from consideration but not canceled: 1-32, 36-52

3. Claims pending: 33, 35 and 53

4. Claims allowed: none

5. Claims rejected: 33, 35 and 53

### C. Claims on Appeal

The claims on appeal are claims 33, 35 and 53.

## III. STATUS OF AMENDMENTS

Appellants did not file an amendment after Final Rejection.

## IV. SUMMARY OF CLAIMED SUBJECT MATTER

In the following summary of the claimed subject matter, the reference numbers in parentheses indicates a page number followed by a line number from the specification as filed (and as published in WO03/078705) where the element is described. These numbers are provided for the aid of the Board to quickly identify relevant section of the specification, but should not be considered to be the sole source of support.

The invention as set forth in the claims under appeal relates to a method of making a reversed heat-set fiber (24, 1-2) which method includes the following steps:

a) applying a biasing force (23, 21)to a melt-spun (22, 3) elastic fiber (1, 5) that will recover at least 50% of its stretched length after the first pull and after the fourth pull of four consecutive pulls to 100% strain (10, 9-10);

b) heating the stretched fiber of step a) to a temperature in excess of a temperature at which at least a portion of the crystallites are molten (23, 22-24);

c) cooling the heated fiber of step b) to a temperature below the temperature of step b) (23, 25-26);

d) removing the biasing force from the cooled fiber of step c) (23, 26); and

e) thereafter heating the fiber to a temperature in excess of a temperature at which at least a portion of the crystallites are molten such that the length of the fiber obtained in step e) is less than the length of the fiber obtained in step d) (23, 28 to 24,2).

Further embodiments add that a yarn made according to the method is used in a warp beam (24, 12), or that elastic fiber is combined with inelastic fiber to form a yarn prior to step a) (4, 14-20).

V. GROUNDS OF OBJECTION TO BE REVIEWED ON APPEAL

1) Whether claims 33 and 53 are obvious over US 3,325,876 to Ibrahim in view of US 5,116,662 to Morman, US 4,798,880 to Lodoen, and US 5,340,902 to Smith et al.

2) Whether claim 35 is obvious over US 3,325,876 to Ibrahim in view of US 5,116,662 to Morman, US 4,798,880 to Lodoen, US 5,340,902 to Smith et al. and US 2,037,513 to Kahlisch.

VI. ARGUMENT

Claims 33, 35 and 53 are currently pending in the above-identified application. Claims 33 and 53 are rejected under 35 USC § 103(a) as being obvious in light of Ibrahim (US 3,325,876) in light of Morman (US 5,116,662), Lodoen (US 4,798,880) and Smith et al (US 5,340,902). Claim 35 is rejected under 35 USC § 103(a) as being obvious in light of Ibrahim (US 3,325,876) in light of Morman (US 5,116,662), Lodoen (US 4,798,880) and Smith et al (US 5,340,902) in further view of Kahlisch (US 2,037,513).

A. Ibrahim (US 3,325,876)

The primary reference used by the Examiner is Ibrahim. Ibrahim teaches the following (with the numbers in parentheses indicating the column(s) and line number(s) in Ibrahim):

a) stretching elastic fibers to a predetermined amount less than the breaking elongation (2, 7-9);

b) subjecting the stretched fiber of step a) to a heat setting step (2, 9) of "relatively mild" (2, 48) order;

c) blending the heat-set elastic fibers with inelastic fibers (2, 10)

d) processing to yarns (2,11); and

e) thereafter exposing the yarns to a treatment which will release or "unlock" them from the heat-set condition and permit the elastic fibers to contract to impart stretch to the composite yarns (2, 12-17).

1) Claim 33

While at first glance, the teachings of Ibrahim may appear to be somewhat similar to the invention set forth in the claims under appeal, there are several important differences. First of all, it appears that Ibrahim relates to staple fibers and not a melt spun fiber as recited in claim

33. This is clear from Ibrahim's initial statement of the object of the invention as an "improved method for preparing high-stretch, high recovery yarns from a blend of a minor proportion of elastic staple fibers . . .". (1, 70-2,1) Further see column 1, line 15; column 2, line 61; and the Examples which refer to US Pat. 3,077,006, which is entitled, "Production of Staple Fibers". As known in the art, staple fibers are discontinuous or cut fibers of a finite length. Melt spun fibers, however are known to be continuous fibers. As will be readily appreciated, teachings specific to staple fibers of finite length, are not readily applicable to continuous fibers. For example the process of applying strain to a fiber and holding it there during a heat setting process, is much simpler for a fiber of fixed length than it is for a continuous fiber. Ibrahim does suggest that the heat setting may be done to the tow before being cut to staple lengths, however (2, 19-21), and it is acknowledged that the term "tow" refers to a continuous fiber which *may* have been produced as a melt spun fiber.

Secondly, there is no express teaching in Ibrahim that the elastic fiber fiber will recover at least 50% of its stretched length after the first and fourth pull of four consecutive pulls to 100% strain. However, Appellants do not contest that the fibers of Ibrahim would inherently meet this limitation.

Most significantly, however, there is no teaching in Ibrahim that the heat setting procedure should be carried out at a temperature in excess of a temperature at which at least a portion of the crystallites are molten. Ibrahim cautions against using too high of a heat-setting temperature, stating, "The heat-setting treatment should be of a relatively mild order such that the elastic fibers are heat-set temporarily in their elongated condition. The treatment should not be so severe as to permanently stabilize the elastic fibers" (column 2, lines 47-51). This specific teaching would cause a person of ordinary skill in the art to seek to use the minimal temperatures possible for heat-setting which would be less than the temperature at which crystallites in Ibrahim's fibers become molten.. At column 2, line46, Ibrahim refers to Canadian Patent 621,569 for the general heat-setting procedures. That reference teaches that the mechanism for heat setting elastic fibers is not based on melting crystallites but rather, the breaking of hydrogen bonding (see page 8, lines 4-11 of CA 621,569). Thus, the teaching in Ibrahim is to heat to the minimal level where a reduction in hydrogen bonding is observed, which has nothing to do with melting crystallites as recited in the present claims.

In the Office Action dated August 20, 2009, at page 3, lines 8-12, the Examiner acknowledged that Ibrahim does not teach heating the fiber until the crystals are molten, but argued that it would have been obvious "to modify the process of Ibrahim to use higher temperature heat-setting and relaxing because it has been held that optimization of a result effective variable is within routine skill in the art." However, this argument completely disregards the express teachings in Ibrahim itself to use heat-setting conditions of a "relatively mild order" (2, 47-48). It is not clear why a person of ordinary skill in the art would ignore this explicit teaching, raising the temperature to a point where the crystallites become molten in order to optimize the process, particularly when there is no teaching in Ibrahim that melting the crystallites helps the process in anyway.

2) Claim 53

Claim 53 of the present application adds the further limitation that inelastic fiber is combined with the elastic fiber prior to applying the biasing force (i.e. prior to step a)). Ibrahim teaches that its inelastic fibers are combined after heat-setting (2, 10). The Examiner has stated that "it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the inelastic material prior to the heat setting step since it has been held that rearrangement of process steps is within routine skill of one in the art." (Office action dated 12/23/2008, page 3, lines18-21). The Examiner has not provide a cite for this holding, however Appellants respectfully submit that any such holding must have been specific to a particular process, as while rearrangement of process steps may be interchangeable in *some* processes, it is not true that rearrangement of process steps can be done in *any* processes. For example, consider a two-step process for making tea comprising the steps of heating water to boiling and steeping a tea bag in the water for two minutes. The order which these steps are taken is clearly not interchangeable. Furthermore, even taking the position that it is generally known that the order of process steps are interchangeable, such a *general* understanding would not override the *specific* teaching of Ibrahim that the inelastic fibers should be combined with the elastic fibers only after the elastic fibers have been heat set. In the paragraph beginning at column 1, line 32, Ibrahim states that the woolen spinning process is thought to be inherently incompatible with the requirements for producing high-stretch yarns. Ibrahim goes on to state that woolen spinning conditions use relatively low draft levels, do not use positive draft controls such as rollers and

aprons, and are customarily loosely twisted structures, such that "it is difficult to maintain even the small amount of stretch that may have been imparted to the elastic fibers in the blend [with inelastic fibers]" (column 1, lines 66-68). To avoid this problem, Ibrahim teaches that the fibers should heat-set prior to combining them with the inelastic fibers (see column 2, lines 59-63). The examiner has provided no reason why a person of ordinary skill in the art would disregard this specific teaching that the order of the steps is important, and rearrange the steps to the order recited in claim 53 other than to say that process steps are generally interchangeable.

B. Morman (US 5,116,662), Lodoen (US 4,798,880) and Smith et al (US 5,340,902)

The Examiner has also cited Morman (US 5,116,662), Lodoen (US 4,798,880) and Smith et al (US 5,340,902) to support the obviousness rejection. Morman is used for the proposition that elastic fibers are known to recover at lest 50% of its length after stretching (see page 3, lines 4-5 of Final Office Action dated Aug 20, 2009). The Appellants do not contest this point. Notably, however, the Examiner does not allege that Morman teaches heat-setting the fibers at a temperature in excess of a temperature at which a portion of the crystallites are molten.

With respect to Lodoen, the Examiner has stated, "Lodoen teaches that the heat-set and heat-relax temperatures are result effective variables because they affect the processing time" (see page 3, lines 12-13 of Final Office Action dated Aug 20, 2009). The Examiner then concluded that "One of ordinary skill in the art at the time of the invention would have had a reasonable expectation of success employing higher heat-set and heat-relax temperatures because Lodoen teaches it is known to heat-set and heat-relax spandex at high temperatures. (see page 3, lines 14-16 of Final Office Action dated Aug 20, 2009). First of all, Appellants point out that the passage discussing heat-set and heat relax temperatures referred to by the Examiner (at column 4, lines 1-6 of Lodoen) states that the filaments are "usually" heat set at temperatures from 145°C to 165°C, but that the higher temperatures sometimes can be employed satisfactorily. Thus this passage actually reinforces that point that there are known problems with going to high temperatures. Secondly, Lodoen teaches that heat set efficiency is a desirable trait. As is generally known in the art (see for example US 5,539,037) and as generally confirmed from the equation at column 5, line 6, of Lodoen (noting that there is an obvious error

in the description of the equation as $L_f$ and $L_o$ should refer to the length of the fiber before and after the immersion in boiling water as opposed to before and after the entire heat setting treatment as stated in Lodoen), heat setting efficiency is a measure of how resistant the fiber is to reversing the heat-setting process. In other words, the higher the heat-setting efficiency, the less the fiber will revert back to its original length when immersed in boiling water after relaxing the fiber. Therefore Lodoen is teaching a process which should be resistant to having the heat-setting process reversed. Thus the higher temperature taught by Lodoen results in a fiber showing good heat-set efficiency, which is exactly the harm warned about by Ibrahim, namely that if the heat-setting temperatures are not of a "relatively mild order" the process may permanently stabilize the elastic fiber (see Ibrahim, column 2, lines 47-51). Accordingly, as the stated goal of Lodoen is to permanently stabilize the fiber, and as this goal is in direct contradiction to the process of Ibrahim which requires the heat set to be eventually released or "unlocked", it is not appropriate to combine these references in the manner suggested by the Examiner.

The Smith reference is used by the Examiner for the proposition that it is well-known to produce spandex fibers by melt-spinning. Appellants do not contest this point, but note that the Examiner does not assert that Smith teaches heat-setting the fibers at a temperature in excess of a temperature at which at least some of the crystallites are molten.

C. US 2,037,513 to Kahlisch (as applied to Claim 35)

Claim 35 is rejected under 35 USC § 103(a) as being unpatentable over Ibrahim in view of Morman, Lodoen and Smith in further view of US 2,037,513 to Kahlisch. Appellants do not contest the separate patentability of claim 35, but maintain the position that this claim is patentable due to its dependence on claim 33. In that regard it is noted that the Examiner has not asserted that the Kahlisch teaches heat-setting the fibers at a temperature in excess of a temperature at which at least some of the crystallites are molten

Summary

The present claims all require the step of heating the elastic fiber while in a stretched state to a temperature in excess of a temperature at which at least a portion of the crystallites are

molten. The primary reference (Ibrahim) cited by the Examiner teaches away from this limitation when it explicitly warns to use relatively mild conditions in its heat-setting process. The secondary reference (Lodoen) cited by the Examiner for the proposition that a person of ordinary skill in the art would nevertheless use higher temperatures in the heat setting process, has a stated goal of increasing heat-set efficiency. This goal is incompatible with the teachings of the primary reference and so it is improper to combine the references in the manner suggested by the examiner. None of the other secondary references (Morman, Smith et al, and Kahlisch) cited by the Examiner teach the step of heating the elastic fiber while in a stretched state to a temperature in excess of a temperature at which at least a portion of the crystallites are molten. Accordingly, the Examiner has not met his burden of showing that each step in the claimed process would have been obvious to a person of ordinary skill in the art at the time of the invention.

Appellant believes that all Claims, as amended, are inventive and non-obvious over the cited references as they have been applied by the Examiner in the Final Office Action mailed August 20, 2009 and the Advisory Action mailed November 20, 2009.

Accordingly, reversal of all grounds for rejection is earnestly solicited of this Board.

## VII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

## VIII. EVIDENCE

None

## IX. RELATED PROCEEDINGS

None

Dated: February 18, 2010

Respectfully submitted,

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## APPENDIX A

**Claims Involved in the Appeal of Application Serial No.** 10/507,230

33. A method of making a reversed, heat-set elastic fiber-comprising:

(a) applying a biasing force to an elastic fiber that will recover at least 50% of its stretched length after the first pull and after the fourth pull of four consecutive pulls to 100% strain, wherein the elastic fiber is a melt spun elastic fiber;

(b) heating the stretched fiber of (a) to a temperature in excess of a temperature at which at least a portion of the crystallites are molten;

(c) cooling the fiber of (b) to a temperature below the temperature of step (b);

(d) removing the biasing force from the fiber; and thereafter

(e) heating the temperature of the fiber above a temperature at which at least a portion of the crystallites are molten without a biasing force, such that the length of the fiber obtained in step (e) is less than the length of the fiber obtained in step (d).

35. The use of a yarn made according to Claim 33 in a warp beam.

53. (The method of claim 33 wherein the elastic fiber is fiber is combined with inelastic fiber to form a yarn prior to step (a).

## APPENDIX B

**Evidence:**

None

## APPENDIX C

**Related Proceedings:**

None